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(54) FRUIT SPREADS

(71) We, UNILEVER LIMITED, a company organised under the laws of Great Britain, of Unilever House, Blackfriars, London, E.C.4, England, do hereby declare the invention for which we pray that a patent may be granted to us, and the method by which it is to be performed, to be particularly described in and by the following statement:—

The present invention relates to fruit spreads and in particular relates to fruit spreads comprising a plastic water and edible oil emulsion food product containing fruit.

If fruit is incorporated into food spreads such as for example, peanut butter, margarine and butter, to add taste interest, the fruit tends to become hard after normal storage periods, resulting in a gritty product. Also exudation from the fruit because of syneresis shows up as coloured liquid droplets on the surface of the product, making the product unappetising. The keepability of the product during normal storage time periods is poor and the colour of the product soon darkens and a yeasty smell can be detected. Again, if the fruit is pulverised to form a powder, the identity of the fruit is lost and the appeal of the product is correspondingly diminished, whereas it is a decided advantage for consumer appeal to retain the fruit in a recognisable form.

In accordance with our British patent specification No. 1,189,854 a fruit flavoured spread comprises a plastic emulsion of fat and fruit preserve stock, the latter being in the gelled condition. In this product therefore the fruit is preserved by previous cooking with sugar.

The present invention provides a plastic food spread comprising a dispersion made from an edible oil or fat and sugar syrup containing uncooked whole or divided fruit previously preserved by contact with the sugar syrup. A plastic spread can be spread with a knife at 15°C but like margarine normally retains its shape at that temperature.

The invention further provides a process for the preparation of a fruit spread of improved keepability comprising contacting the fruit in whole or divided form with a sugar syrup without cooking it to effect a preservative action and thereafter emulsifying a mixture of sugar syrup containing the uncooked fruit with an edible oil or fat to form a plastic emulsion.

In another of its aspects the invention provides uncooked fruit preserved in a plastic fat emulsion food product whose aqueous phase comprises sugar syrup. By "uncooked fruit" is meant fruit which has not been exposed to heat treatment for any substantial length of time for the individual shape of separate fruit pieces to be lost; the fruit may however be heated as in pasteurisation, augment the preservative action of the sugar syrup with which it is contacted.

For the purpose of the invention edible oils include those glyceride compositions which being normally at least partly solid at ambient temperatures may therefore customarily be termed fats as well as those which under these conditions are normally liquid.

In accordance with the present invention, the spread may comprise an animal, vegetable or synthetic fat or oil. Sugar syrup as used herein refers to an aqueous solution of sugar which may be made by dissolving sugar in water or purchased as such.

In carrying out the process, it is important that the fruit first be contacted with the sugar syrup before the emulsion is made.

The fruit may be used in fresh, frozen or dried state. It is thoroughly mixed with the sugar syrup for a sufficient time and at a sufficient temperature substantially to improve the keepability of the fruit without cooking it. A period of 20 minutes at ambient temperature is usually adequate to provide a product which when mixed with the oil to form a plastic emulsion shows good keepability, the fruit remaining soft and without extensive exudation by reason of syneresis

[Price 25p]

for a period of several months. Without intending to limit the scope of the invention by the expression of any theory as to its operation, it is believed that this contact of the sugar in the syrup with the fruit effects substantial equilibrium of the osmotic pressures between the fruit and the sugar syrup, prior to mixing the oil or fat, which is maintained by the syrup in the emulsion, to preserve the fruit in the product.

Suitable edible oils which may be employed in the present invention include those commonly used in plastic edible oil products, for example margarine and shortening fats or oils, and in general any combination of edible oils, semi-solid or solid fats can be employed giving a plastic product. They may be partially hydrogenated. Examples of suitable oils include coconut oil, palm kernel oil, cottonseed oil, kapok oil, rapeseed oil, peanut oil, olive oil, sunflower seed oil, sesame oil, corn oil, safflower oil, soybean oil, milk fat, beef tallow, mutton tallow, lard, modified lard, and butter fat.

Suitable sugars for use as syrup in the aqueous phase in the invention include for example common granular or powdered sugars including sucrose, dextrose, maltose, fructose, lactose, and brown and invert sugars as well as mixtures of said sugars. Suitable ready made sugar syrups include so-called liquid sugar, refiners syrup, and honey.

While the particular sugar or combinations of sugars used is not essential to the invention, it is desirable that the product comprises from 5% to 45% and preferably 12% to 30% by weight of sugar. It has been found that if less than 5% by weight of sugar is present, the product may have a fatty taste. More than 45% by weight of sugar present will not provide any advantage and may unduly sweeten the product for most consumers.

Suitable fruits for use in the present invention include those that will undergo syneresis. They may be used in the fresh, dried or frozen form.

Examples of fruits which may be used in the invention include Thompson seedless raisins, Zante raisins, golden bleached raisins, dates, figs, prunes, apricots, strawberries, blueberries and cherries as well as combinations thereof. The fruit can be present in the product of the invention in whole, or divided form, and may for example be sliced or chopped. Dried fruits, which may be used, are not completely anhydrous but usually contain some water, the amount removed being sufficient to prevent decomposition and ensure bacterial stability.

The preparation of dried fruit and its final characteristics is described for example in Food and Food Products, 2nd Edition, Volume 3, Chapter 33 by Morris B. Jacobs, published by Interscience.

Before the fruit is mixed with other ingredients, preferably the normally unusable parts are removed, e.g., pits, seeds and stems. When for example raisins, blueberries or other small size fruit are used in the product, they can be used whole and still provide substantially even distribution throughout the spread. In a preferred form of the product, however a combination of whole and chopped raisins or blueberries is used, since such a product while still showing clear fruit identification can provide more raisins or blueberries per unit volume of product than can be obtained with only whole raisins or blueberries.

The size of the fruit when chopped or sliced (herein alternatively referred to as "comminuted") can vary over a relatively wide range. In a preferred form of the invention, a predominant portion of the fruit-particle sizes is more than $\frac{1}{8}$ in length.

When the fruit used in the process is to be in comminuted form, standard rotary knife cutters such as the Abbé rotary cutter, the Ball & Jewell rotary cutter, or the Hobart cutter, can be used to obtain the desired particle size.

Edible emulsifiers may be present in the product but their addition may not be necessary under certain process conditions where the ingredients used tend to form emulsions. When an emulsifier is used, its concentration in the product is suitably from 0.05% to 1.0% by weight of product. Examples of such emulsifiers are mixtures of mono- and diglycerides, and acetylated products of such mixtures, lecithin, polyoxyethylene sorbitan derivatives of fatty acids and polyoxyethylene sorbitan monoglyceride. Other suitable emulsifiers can be found in Industrial Oil and Fat Products, 2nd Edition by Bailey, published by Interscience. The product is preferably an emulsion of the water-in-oil type and any emulsifiers added should therefore promote the formation of this type of emulsion.

The products of the present invention may also contain minor amounts of other edible ingredients including conventional margarine ingredients, and the products of the invention include margarine and like plastic food spreads containing frit dispersed therein on which a preservative action is exercised by the presence of sugar syrup comprising the aqueous phase of the spread. Suitable additives include for example flavouring agents, nuts, spices, dyes or colourants, thickeners, for example gums and starches, stabilisers and mould inhibitors. Also, salt, vitamins and minerals may be added to the product to increase its flavour and/or nutritional value. Suitable flavouring agents and spices include cinnamon, fruit flavours, mint, maple and vanilla.

Thickeners may be used to produce a

desired viscosity in the aqueous phase so that the fruit can be distributed more evenly. The gums or starches can be any of those commonly used in food products for example carboxymethyl cellulose, guar, methyl cellulose, alginates, xanthan gum, pectin, and corn, tapioca, potato and rice starch.

Suitable mould inhibitors and stabilisers may also be included in the products of the invention, for example sorbic acid, potassium sorbate, sodium benzoate, esters of parahydroxy benzoic acid, alkali metal salts of propionic acid, butylated hydroxy anisole, butylated hydroxy toluene, propyl gallate, ethylene diamine tetra-acetic acid, malic, citric, phosphoric and tartaric acids and the alkali metal salts thereof.

The amounts of the ingredients present in the products of the present invention are not critical and can vary over relatively wide ranges. Preferably however each of the essential ingredients, water, fruit and sugar is present in a minor proportion of the total composition, whereas the fat is preferably present in the greatest amount as the principal ingredient. More specifically, the concentrations of the ingredients may be as follows:

Product Composition	
Ingredient	Percent by Weight of Product
Fat	30—83 (40—55)
Sugar	5—45 (12—30)
Fruit	2—40 (8—18)
Flavour	0—5 (0.02—0.1)
Colouring	0—1.0
Thickeners (gums and/or starches)	0—10 (0.5—4.0)
Mould inhibitors and Stabilisers	0—0.12 (0.05—0.1)
Vitamins and Minerals	0—5
Emulsifiers	0—1.0 (0.15—0.25)
Water (including water contributed by fruit)	10—40 (20—30)

Exceptionally good results are obtained when the ingredients in the product have the concentrations shown in brackets.

Except for any gum or starch, which must be present in the aqueous phase, the optional ingredients may be present in the aqueous or the fat or oil phase prior to mixing the two.

In the first stage of the process for making the product of the invention sugar syrup is mixed with whole or divided fruit and is then preferably treated at an elevated temperature, preferably from 174°F. to 185°F., in order to pasteurise but not cook the fruit. This is unnecessary if sterile fruit is used. The fruit should preferably be held in the aqueous phase for at least 20 minutes in order to minimise syneresis in the final product.

In a preferred method of preparing the products of the invention, the oil phase is prepared by introducing into a churn the fat or

oil ingredient with any other optional ingredient for example colouring agents, flavouring agents, and emulsifiers. The ingredients are then mixed until a homogeneous product is obtained. If a semi-solid or solid fat is used, the churn is heated with heating coils in order to liquefy the mixture, making it easier to pump and blend, the temperature to which the material is heated being dependent on the melting point and the processing characteristics of the fat. After churning the oil phase is then quick chilled before mixing with the aqueous phase, in conventional shortening or margarine equipment, comprising precrystalliser and Votator units in series, if desired after adjusting the density of the fat by incorporating a gas, for example air, nitrogen or carbon dioxide. The amount of gas introduced is preferably from 20% to 45% by volume, but more or less may be used according to the density and spreadability required.

The chilled oil phase and aqueous phase are then blended together to form the final product, in a mixer comprising a modified Votator B unit having fixed and moving interdigitating fingers, supplied through a proportionating pump with the aqueous phase. The product may then be immediately placed in suitable containers for sale.

The oil and water emulsion comprising the plastic spread is preferably of water-in-oil.

The following examples further illustrate the present invention.

EXAMPLE 1

An aqueous phase comprising the following ingredients was prepared:—

Aqueous Phase	
Ingredient	Parts By Weight of Product
Sucrose Syrup—67% sugar solids	26.0
Carboxymethyl cellulose	0.2
Whole Thompson seedless raisins	3.3
Comminuted Thompson seedless raisins	3.3
Cinnamon	0.32
Whole Zante currant raisins	6.6
The fruit contained 18 wt.% water.	115
Oil Phase	
Hydrogenated cotton seed oil	48.0
Lecithin	0.11
The balance to 100 parts by weight of the product being made up of colouring (Carotene—3700 units per pound) and water.	125

The Thompson seedless raisins were previously chopped in a Hobart cutter to yield an average particle size of about 1/32 inches. The aqueous phase containing the raisins, after standing for 20 minutes, was blended, in accordance with the preferred method disclosed above for preparing the products of the invention, in a modified Votator B unit with previously chilled oil phase.

The final product was stable at 45°F for a period of 6 months and the fruit retained its initial softness and exhibited no extensive syneresis. The product was also uniform and non-gritty and could easily be spread at ambient temperatures.

In further products chopped dates, figs, prunes, and apricots were substituted for the chopped and whole raisins. All the final products had similar stability and pleasant palatability characteristics.

Example 2

Aqueous and oil phases of the following components were prepared as described in Example 1, nitrogen in the oil phase giving 0.6 g/c.c. density.

Aqueous Phase		Parts By Weight of Product
	Ingredient	
30	Lactose	5.0
	Dextrose	7.0
	Methocel	0.1
	Whole blueberries	13.0
	Cinnamon	0.02
	Fruit flavour	0.08
35	Sorbic acid	0.05
	Citric acid	0.05
	Water	13.0
	Vanilla	0.3
	Potassium Sorbate	10.05
40	The fruit contained 85—90 wt. % water	

		Oil Phase	
	Hydrogenated Oil	Safflower	40.0
45	Hydrogenated Oil	Rapeseed	25.0
	Lecithin		0.10

The aqueous and fat or oil phases were then mixed as in Example 1, to produce a plastic product which was appetising and exhibited good stability under normal storage conditions and in which the fruit retained its original softness and showed no extensive syneresis.

Similar products based on milk fat, beef tallow, mutton tallow, kapok oil, palm kernel oil, and peanut oil instead of the mixture of safflower and rapeseed oil were prepared and were similar in stability and palatability.

Example 3

		Parts By Weight of Product	
Ingredient			
	Raisins (Zante, whole)	6.6	60
	Raisins Thompson Seedless, whole)	3.3	65
	Raisins (Thompson Seedless, chopped)	3.3	
	Liquid sugar (67% sugar solids)	13.2	
10	Golden Sucrose (70% sugar solids)	13.2	70
	Potassium Sorbate	0.1	
	Salt	1.0	
15	Butylated hydroxy anisole	0.002	
	Ethylene diamine tetra-acetic acid	0.005	75
	Caramel (powdered)	0.07	
	Cinnamon (powdered)	0.26	
	Carboxymethyl cellulose	0.2	
20	Oleoresin cinnamon	0.02	80
	Water	10.397	
	The fruit contained 18 wt. % water.		

Oil Phase

		Parts By Weight of Product	
Ingredient			
	Partially hydrogenated cottonseed (15%) and soybean oil (85%, Iodine Value 95)*	48.00	90
	Monoglyceride	0.22	
	Lecithin	0.12	
	Carotene 4.4 ppm	0.06	

*Solid Fat Index 12 at 21.1°C., 0 at 40°C. and not more than 3.5 at 33.3°C.

The aqueous phase was prepared by adding the dry ingredients to the water in a Pfaudler mix tank. The sugar syrups and raisins were then added and the entire mixture pasteurised by heating for 20 minutes at 180°F. The pasteurised phase was then cooled to 100°F.

A shortening was prepared from the oil phase. The aqueous phase was blended into it in an in-line mixer in the proportion of 52% with 48% of the oil phase, the final product being filled into round tubs. An excellent plastic product was obtained which was tasty, smooth non-gritty and spreadable. The product was also stable for greater than 6 months at 45°F.

Example 4

Aqueous Phase

		Parts By Weight of Product	
Ingredient			
	Sucrose Syrup (67% sugar solids)	26.0	115
	Carboxymethyl cellulose gum	0.2	
55	Whole blueberries	9.9	120

Example 4 Cont.			may be spread on bread or used as fillings or toppings for pies, buns and sandwiches.	60
Aqueous Phase			The words "Methocel", "Hobart", "Votator" and "Tween" used in this specification are Registered Trade Marks. The "Votators" are scraped surface heat exchangers.	65
Parts by Weight of Product			We are aware of the Preservatives in Food Regulations 1962 No. 1532 and the Anti-oxidant in Food Regulations 1966 No. 1500, and in so far as this invention relates to a process for the preparation of food for sale in the United Kingdom and/or sale of food in the United Kingdom so prepared, we make no claim to the use of the invention in contravention of the law.	70
Ingredient			WHAT WE CLAIM IS:—	75
5	Chopped blueberries	3.3	1. A plastic food spread comprising a dispersion made from an edible oil or fat and sugar syrup containing uncooked whole or divided fruit previously preserved by contact with the sugar syrup.	80
	Cinnamon	0.32	2. A fruit spread according to Claim 1 and comprising 30—83% fat, 5—45% sugar, 2—40% fruit and 10—40% water by weight of the total composition of the spread.	
	Water	11.95	3. A fruit spread according to Claim 1 or 2 in which the fat comprises a margarine or shortening fat.	85
The fruit contained 85—90 wt.% water.			4. A fruit spread according to Claim 1 or 2 in which the fat comprises butter fat.	
Oil Phase			5. A fruit spread according to any of the preceding claims which comprises a water-in-oil emulsion.	90
Parts By Weight of Product			6. A fruit spread according to any of the preceding claims in which the fruit comprises dried fruit.	95
Ingredient			7. A fruit spread according to any of the preceding claims which comprises fat as the principal ingredient.	
10	Hydrogenated cottonseed oil	48.0	8. A fruit spread according to any of the preceding claims which contains a minor amount of an additional margarine ingredient.	100
15	Lecithin	0.11	9. A fruit spread according to any of the preceding claims which contains 0.05—1.0 wt. % of an emulsifier.	105
	Partial glyceride emulsifiers	0.22	10. A fruit spread according to any of the preceding claims which contains a thickening agent.	
The aqueous and oil phase were prepared and mixed in accordance with the process of Example 1.			11. A fruit spread according to any of the preceding claims which contains an aerated edible oil or fat.	110
The final product was appetising and stable under normal storage conditions and the fruit retained its original softness and showed no extensive syneresis. The product was also			12. A fruit spread substantially as described with reference to any of the accompanying examples.	
25	tasty, smooth and non-gritty and spread easily at room temperature.		13. Process for the preparation of a fruit spread of improved keepability which comprises contacting whole or divided fruit with a sugar syrup without cooking the fruit to effect a preservative action and thereafter emulsifying a mixture of sugar syrup containing the uncooked fruit with an edible oil or fat to form a plastic emulsion in which the fruit is dispersed.	115
Example 5				120
A product was prepared as described in Example 1, using the following ingredients:—				
Aqueous Phase				
Parts By Weight of Product				
Ingredient				
	Lactose	5.0		
35	Dextrose	7.0		
	Methocel	0.1		
	Dates (chopped)	13.0		
	Cinnamon	0.02		
	Fruit Flavour	0.08		
40	Sorbic Acid	0.05		
	Citric Acid	0.05		
	Water	13.0		
	Vanilla	0.3		
	Potassium Sorbate	0.05		
45	The fruit contained 20—25 wt.% water.			
Oil Phase				
Milk Fat				
	Lecithin	65.0		
		0.1		
50	An excellent plastic product was obtained which was tasty, smooth and non-gritty. The product also showed good stability under normal storage conditions.			
55	A similar product was obtained with the inclusion in the oil phase of 0.5 parts by weight of each of Tween 60 and 80 (polyoxyethylene sorbitan monoglyceride) emulsifiers.			
The fruit spreads of the present invention				

14. Process according to Claim 13 in which sugar syrup is heated to pasteurise the fruit before mixing with the oil or fat.
- 5 15. Process according to Claim 13 or 14 in which the fruit is contacted for at least 20 minutes with the sugar syrup before mixing with the oil or fat.
- 10 16. Process according to Claim 13, 14 or 15 in which the sugar syrup contains from 5 to 45 wt. % of the spread, of sugar.
17. Process according to any of the preceding claims 13—16 in which oil or fat is chilled and worked in scraped surface heat exchange units before mixing with the sugar syrup containing the fruit. 15
18. Process according to Claim 17 in which the fat is aerated before mixing with the sugar syrup containing the fruit.
19. Fruit spreads containing preserved fruit whenever prepared by a process as claimed in any of the preceding claims 13 to 18. 20

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